

XV. *Essay on the Genera and Species of British Formicidæ.*
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[Read December 4th, 1854.]

IN offering the present Essay to the notice of the Entomological Society, I beg that it may be considered as an attempt to form a correct census of the number of indigenous species of Ants; this family of insects has hitherto obtained so small a share of indefatigable research, that it will be evident, the present list must not be considered as one which approaches a complete Fauna, but which embodies descriptions merely of all the present known species inhabiting Great Britain. Every care has been bestowed upon their identification with the species described by Nylander, Foerster, and others; and, in most instances, aided by a comparison with typical specimens presented by those eminent Entomologists to the author: possessing these valuable and most efficient aids, I present the following Essay with a greater degree of confidence than I otherwise could have assumed.

Tribe HETEROGYNA.

Family FORMICIDÆ.

The *Formicidæ*, or Ants, is composed of a large group of insects, probably exceeding in the number of its species that of any family of *Hymenoptera*: the *Ichneumonidæ* alone, in my opinion, may probably equal it. It is true that the known British species are few in number, for the metropolis of these insects lays in the tropics, from whence they appear to diverge, gradually becoming less numerous as they approach the frigid regions of the arctic circle. The number of species which inhabit the New World, if we may form a calculation from the observations of an intelligent and indefatigable Naturalist, Mr. W. H. Bates, must, as he justly observes, "exceed all that can be reasonably imagined;" for he continues, "I think it will reach the number of 400 species in the the Valley of the Amazons alone; there appears to be a distinct species of *Myrmica* in every twig and stem in the woods." If such be the case in so limited a district, what must be the number when those which inhabit the vast lands of Africa, India, Southern Europe, and the remaining portions, South and North America,

become known? how few of the species which inhabit the Continent of Australia are yet known to us—what knowledge have we of those of Madagascar and the adjacent islands? New Zealand must also be rich in species belonging to this tribe.

It is, however, our province in this Essay to describe the species which inhabit the United Kingdom of Great Britain, and we have only glanced at those which inhabit other countries, in order to establish our position, of the important part which these insects must perform; and consequently, how beneficial must be results of their economy, in the great scheme of beneficence which caused “the earth to bring forth the living creature after his kind,” “and every thing that creepeth upon the earth after his kind,” “and behold it was very good.”

These interesting insects have at all times attracted the attention of man, and from the remotest periods have served, by their industry and untiring perseverance, to inculcate lessons of the highest moral tendency. The proverb of Solomon is engraven upon the minds of our children from their earliest years; and although the Ants of northern latitudes do not provide their meat in the summer, and gather their food in the harvest, in the general acceptance of this proverb, still such may be the case in other countries. Be that, however, as it may, the words of the great Hierophant inculcate the necessity of using our unceasing endeavours to perform with industry the duties assigned to us, in whatever station of life Providence has placed us.

On the Continent, the Ants have had their monographer in the illustrious Latreille; the “*Histoire Naturelle des Fourmis*,” is the text book of Hymenopterists. Since the publication of this work in 1802, no important work on the Ants of Europe appeared until the publication of Dr. Nylander's Monograph on the Ants of Northern Europe: this work will be acknowledged universally as being the most complete and accurate on the European *Formicidæ*.

In addition, we must also record the labours of Foerster on the *Formicariæ*, and also of Mayr of Vienna; the works of these Entomologists contain descriptions of nearly all the known species of Europe. Mr. Curtis has recently added some species unknown to the authors I have named. Our own countryman, Gould, in 1747, published a valuable treatise on these insects: he describes five species of British Ants; these were all with which he was acquainted, one belongs to the genus *Myrmica*. The great value of this work is the accuracy with which their habits are described; as a proof of which may be mentioned, that Gould particularly

distinguishes the difference in their metamorphosis. Of the red Ants he says, "they do not, like the rest, unfold themselves in a tissue or shell;" he also notices "two sizes of workers, and that the red Ants are furnished with a sting; these observations were made previous to the publication of the "Fauna Suecica" of Linnæus.

Of the number of species which inhabit Great Britain, we are, I believe, at present ignorant. The publication of Nylander's work has directed our attention more particularly to this point, and several new species have been discovered, but when the remote and Alpine districts of Scotland shall have been well explored, doubtless many others will be found; I am acquainted with twenty, whilst only thirteen of those given in the Systematic Catalogue by Stephens are indigenous and distinct. My observations on the habits of Ants would add little to what has already been made known by Gould, Huber and others; indeed, so much has been done by the naturalists named, that it will only be necessary, in some points, to add my testimony to the accuracy of the more remarkable peculiarities in their economy, as detailed in the works of the authors alluded to.

As a general rule, we may observe, that it is only the species of the genus *Formica* which in the pupa state are enclosed in a cocoon spun by the larva; those belonging to the genus *Myrmica* do not spin a cocoon. It is a trite remark, that every rule has its exception, and such is the case with these genera. I have occasionally observed, during the months of July and August, pupæ of *Formica fusca* not enclosed in cocoons, and such pupæ in various stages of maturity; I have also observed the same of the pupæ of *F. fuliginosa*, great numbers of which I found in channels constructed under the bark of a decaying birch tree.

The closest observation has not enabled me to trace the larvæ of Ants continuing in that form, "about a year and a quarter," as stated by Gould; indeed, I have never been able to find any larvæ in the nests of *F. rufa*, or *F. fusca*, after the end of autumn; but as regards colonies of *F. flava* and *F. nigra*, larvæ will frequently be found in the depth of winter: these are carried by the workers into the deepest chambers of their dwellings; and it is a remarkable circumstance, that the larvæ of *F. flava*, which pass the winter in that state, are densely covered with pubescence; I have also found numbers of a dark-coloured *Aphis* in chambers apart from the torpid larvæ of the Ants, in the depth of winter. Much attention has been paid to the subject of insects found in Ants' nests, many of those enumerated being merely casual or

accidental visitors ; but that many are in some way highly necessary, or highly conducive to some important point in the economy of the *Formicarium*, is, I think, easily proved. In the first place, I would mention the presence of *Aphides* in the nests of *Formica flava* : of these I have observed great numbers in some colonies, they are kept usually apart from the full-grown larvæ and pupæ, and are eagerly carried off by the Ants, when exposed by the removal of a part of the Ant-hill, or, as may be better observed, by the removal of a stone, when the nest is constructed beneath ; it was in the latter situation that I first discovered *Claviger foreolata*, in 1844, in considerable numbers in the channels or galleries of the *Formicarium*, the *Claviger* was quickly seized upon by the Ants, and carried down into the subterranean labyrinths.

I have also obtained considerable numbers of insects which are imprisoned by Ants, by watching Ant-hills in the spring, and observing all that is carried to them by the Ants : I have secured numbers of *Myrmedonia canaliculata*,—*limbata* and *humeralis*, and also of *Lomechusa emarginata* ; the latter insect is found sometimes in the nests of *F. fusca*, and *F. rufa*, but it is usually much more abundant in the nests of *Myrmica*. In the nest of a species of the latter genus I found a specimen of *Batrisus formicarius*, in Yorkshire. Many other insects will no doubt be met with in nests of *Formicidæ* ; I have only mentioned such as I have seen conveyed there by the Ants themselves, these being doubtless highly beneficial in working out some important phase in their economy ; and it has probably occurred to others as well as to myself, that the aliment obtained from these insects may have some stimulating properties, highly conducive to the development of the sexes — but this point requires careful investigation ; I would observe, however, as bearing upon this supposition, that I never observed an Ant conveying these insects subsequent to the development of the males and females. There is another insect, which belongs, I believe, to the order *Homoptera*—*Dorthesia cataphracta*—which is constantly found in most of the nests of the *Formicidæ* ; these have frequently been mistaken for the young of *Oniscus*, which they greatly resemble in form, but are of a different colour, being snow-white : whether the presence of these insects is in any way conducive to the development of any portion of their economy, I am not prepared to advance an opinion upon, but I have usually observed them in all the nests of the *Formicidæ*.

The *Formicidæ*, as a group, may be characterized as social

insects, living in societies, consisting of males, females, and workers—the males and females winged, the latter only temporarily so : the workers being divided into two classes, one consisting of labourers, which are exclusively occupied in the formation of the nests, or in feeding the young brood ; the second division consists of soldiers or guards, these not only defend the citadel from the attacks of other insects, but also in some species capture and make slaves of others : the only one which does so in this country being the *Formica sanguinea*, which is very abundant in Hampshire, where I once witnessed an attack upon a nest of *Formica fusca*—workers and pupæ were both carried off by the sanguine Ants. On examining a colony of this species, I found workers of *F. fusca*, *F. flava*, and a few individuals of *Myrmica rubra*, all living in community.

Although the *Formicidæ* have been divided into sections, each composed of societies which follow one habit of economy—as mining-Ants, timber-Ants, mason-Ants, &c.—still each species is constantly found under different phases of habit ; the wood-Ant will be found in a decayed tree, or, as I have observed it, in a turf bank : but these deviations are not frequent in this species, which is one of the most constant in habit. The jet-ant, *F. fuliginosa*, is also very constant in forming its habitation in decaying trees, but this also I have found excavating its galleries in a sand-bank ; such deviations give us opportunities of extending our admiration of the wonderful ingenuity constantly shown by these insects, in adapting their habits to the circumstances into which accident sometimes throws them.

GENUS FORMICA.

The maxillary palpi 6-jointed ; the labial palpi 4-jointed. *Antennæ*, the scape elongate, usually more than two-thirds of the length of the flagellum : the flagellum 12-jointed in the females and workers, 13-jointed in the males ; the scape in the male not quite half the length of the flagellum ; eyes lateral, ovate ; ocelli 3 in a triangle. Males and females winged, constant in the former, temporary in the latter sex ; the superior wings having one marginal, one submarginal, and one discoidal cell ; eyes of the males large and prominent, genital organs exserted. *Abdomen* composed of 6 segments in the females and workers, and of 7 in the males, the first segment in all the sexes forming a flattened scale : neither of the sexes furnished with a sting.

The pupa enclosed in a silken cocoon spun by the larva.

Sp. 1. *Formica rufa*.

Fœmina.—Rufo-ferruginea—fronte cum occipite, mesothorace supra, scutello et post-scutello, et abdomine supra castaneo-nigris; clypei medio, palpis, antennis, mesothorace, tibiis, tarsisque fusciscentibus; squama lata subtriangulariter fere rotundata margine supero inequali; alis fusco-hyalinis, apicis subhyalinis.

Operaria.—Testaceo vel rufo-ferruginea nuda, levissime cinereo-micans, fronte cum occipite et abdomine castaneo-fuscis; occipite, antennis, tibiis, tarsisque fusciscentibus; squama, abdominis basi et ano rufo-maculatis.

Mas.—Nigro-fuscus, parum cinereo-nitens, sparse pubescens, pedibus rufescentibus; squama subquadrata humili crassa, supra vix vel parum concaviuscula; valvula ventrali pilosula sæpe rufescente.

Formica rufa, Linn. Faun. Suec., No. 1721; Syst. Nat., i. 962, 3; Scop. Ins. Carn., p. 313, 836; Fabr. Ent. Syst., ii. 351, 8; Syst. Piez., 396, 11; Schrank, Ins. Aust., No. 834; Rossi, Faun. Etrus., ii. 113, 836; Don. Brit. Ins., xiv. 76, tab. 496; Latr. Fourm., p. 143, tab. 5, fig. 28, ♀, ♂, ♂; Jurine, Hym., p. 272; St. Farg. Hym., i. 201, 3; Curtis, Brit. Ent., xvi. tab. 752; Zett. Ins. Lapp., 449, 5; Nyland. Mon. Form. Boreal., p. 902, 5; Foerst. Hym. Stud. Form., p. 13, 3.

Formica dorsata, Panz. Faun. Germ., 54, 1, ♀.

Formica obsoleta, Zett. Ins. Lapp., 449, 5, ♂, ♀.

Formica lugubris, Zett. idem, 449, 6, ♂.

Female.—Length $4\frac{1}{2}$ —5 lines. Head as wide as the thorax, fusco-nigro; the sides of the face below the eyes, and the cheeks, rufo-testaceous. Antennæ fuscous, the scape sometimes rufo-fuscous; the mandibles rufo-ferruginous, covered with a short sparing pilosity, the eyes pilose. Thorax rufo-ferruginous, subovate; the disk, scutellum and post-scutellum nigro-fuscous, the scutellum polished; a slightly impressed line on the mesothorax anteriorly, not reaching the middle of the disk, a similar abbreviated line on each side over the insertion of the wings, the latter fusco-hyaline, paler towards their apical margins; the coxæ, trochanters and femora rufo-ferruginous; the tips of the femora, tibiæ and tarsi fusco-ferruginous. Abdomen nigro-fuscous, subglobose, smooth and shining, the scale, base and apex rufo-ferruginous.

Worker.—Length 3—4 lines. Head and thorax rufo-ferruginous; the vertex, and a broad stripe, passing from the vertex of the eyes to the insertion of the antennæ, nigro-fuscous; an impressed line passes from the anterior stemma to the base of the clypeus; the latter has a fuscous stain in the centre, the antennæ of the same colour, the eyes black. Thorax elongate, compressed; a deep strangulation between the meso and metathorax; the prothorax has a fuscous spot above; the metathorax elevated: the abdominal scale sub-rotundate, slightly notched above; the scale, coxæ, trochanters, and base of the femora, rufo-ferruginous; the femora, tibiæ and tarsi dark rufo-testaceous. Abdomen ovate, nigro-fuscous, covered with an obscure cinereous pilosity, a few scattered pale hairs at the apex; beneath nigro-piceous.

Male.—Length 4—5 lines. Nigro-fuscous; head not so wide as the thorax, eyes large, prominent and oblong-ovate; the head and eyes slightly pilose. Thorax elongate-ovate, the scutellum and metathorax shining; wings as in the female; the femora and knees rufo-testaceous. Abdomen as long as the head and thorax, the margins of the segments polished, the apex rufo-testaceous.

This species is perhaps the most generally known of all our indigenous ants, and has hence acquired several popular appellations, as the Pismire, the Hill Ant, the Wood Ant, and the Horse Ant; the latter possibly from its habit of carrying burdens of sticks, leaves, &c. in constructing its nest; it is found in all parts of the kingdom, but I have observed its colonies to be larger and most numerous in the north, particularly in open spaces in fir woods; the nest of this Ant is resorted to by the larvæ of several Coleopterous insects for the purpose of undergoing their transformations. I have found the *Cetonia aurata*, and numbers of pupæ and perfect individuals of *Clythra 4-punctata*, in nests which I have met with in Yorkshire.

Sp. 2. *Formica sanguinea*.

Fœmina.—Rufo-ferruginea, levissime cinereo-micans, fronte cum vertice et abdomine castaneo-fuscis; squama subtriangulariter rotundata, margine supero vel integro vel leviter emarginato; alis a basi ad medium pallide rufescentibus.

Operaria.—Capite, thorace pedibusque sanguineis, clypei marginis leviter emarginato; abdomine castaneo-fusco.

Mas.—Fusco-niger, pedibus pallide rufescentibus, clypeo obsolete emarginato; squama crassa, transversim subrectangulari, supra integra, vel late subemarginata.

Formica sanguinea, Latr. Hist. Nat. Fourm., p. 150, pl. 5, fig. 29, ♂; Jurine, Hym., p. 272; St. Farg. Hym., i. 203, 4; Foerster, Hym. Stud. Form., p. 20, 6, ♀; Smith, Cat. Brit. Hym. Append., 115, ♂, ♀, ♀.

Formica dominula, Nyland. Adno. Mon. Form. Boreal. Eur., p. 905, 6, ♂, ♀, ♀.

Female.—Length 4—4½ lines. Head, thorax, legs and scale of the abdomen of a sanguine red; the face above the insertion of the antennæ and the vertex obscurely fuscous; the inferior margin of the clypeus distinctly notched in the middle: the mesothorax having three indistinct fuscous stripes; the wings have the basal half of a smoky brown, the nervures and stigma fusco-ferruginous. Abdomen slightly red at its extreme base, the apical segment slightly pubescent; the margins of the segments having a few glittering pale hairs.

Worker.—Length 3—4 lines. Very similar to *F. rufa*; but the head, thorax and legs are entirely red; the anterior margin of the clypeus distinctly emarginate; the scale subtriangular, rounded at its superior margin and slightly emarginate in the middle; abdomen as in the female.

Male.—Length 4 lines. Resembles that of *F. rufa*. The legs are entirely red; the flagellum fusco-ferruginous, the extreme base of the scape ferruginous; the anterior margin of the clypeus slightly notched in the middle; the mandibles longitudinally rugose, rufo-piceous towards their apex; the eyes not pilose as in *F. rufa*; the scale sub-emarginate above, or rather transversely entire, having the lateral angles somewhat raised: wings as in the female; abdomen as long as the head and thorax, covered with a changeable sericeous pile.

Var. β . ♀. The head and thorax entirely of a blood red.

Var. β . (♂ major) having the vertex and front fuscous.

The (♂ minor) has the vertex and front, the disk of the prothorax, the coxæ, trochanters and femora, more or less fuscous.

I think there can be no doubt of this species being the *sanguinea* of Latreille. Nylander says that this species as well as his *F. truncicola*, both answer to the description of *sanguinea*; but we must bear in mind at the same time that a figure of the scale is given, and it is much more like that of the present species than that of the worker of *F. truncicola*, and I think Latreille would not have omitted to mention the pubescence with which the latter insect is covered; and, above all, Nylander leans to this opinion: I have therefore adopted Latreille's name.

F. sanguinea occurs plentifully in the fir woods of Hampshire, or rather at their sides. I have always found its colonies in banks, or in stumps of decayed trees. It also occurs at Weybridge. Their societies are not so numerous as those of *F. rufa*; the large workers are very courageous, on disturbing their nest they will seize a finger, and retain their hold until their heads are torn off in removing them; I have found all the sexes in the nest in the month of August.

Sp. 3. *Formica cunicularia*.

Fœmina.—Rufo-ferrugineo, cinereo-micans; palpis, antennarum flagellis abdominisque castaneo-atris; mesothorace maculis tribus longitudinalibus, una antice aliaque laterali utrinque, scutello, post-scutello, mesosterno, tarsi apicis fuscis; squama lata, sub-cordata, vel supra truncata tantum leviter inæquali; alis hyalinis, basi parum fumatis: nervis et stigmatibus fusco-ferrugineis.

Operaria.—Rufo-ferruginea, cinereo-micans; capite supra, palpis, flagellis et abdomine castaneo-atris; thorace supra et pedibus fusciscentibus; squama supra subtruncata vel leviter emarginata.

Mas.—Ater, cinereo-micans, pedibus rufo-testaceis, coxis basi exceptis; oculis nudis, squama supra late concava, valvula ventrali sparse pilosa, disco fere toto subrotundato plane impressiusculo.

Formica cunicularia, Latr. Hist. Nat. Fourm., p. 151; Huber, Rech. Fourm., tab. 2, fig. 11,⁵ 12, 13, ♀, ♂, ♂; St. Farg. Hym., i. 203, 5; Lonsana, Fourm. Pied., 10; Nyland. Adno. Mon. Form., 913, 11; Foerster, Hym. Stud. Form., p. 25, 9.

Formica stenoptera, Foerster, idem, p. 26, 10.

Female.—Length 4 lines. Resembles *F. sanguinea*; the anterior margin of the clypeus somewhat angulated, convex above and subcarinate in the middle; the clypeus, face on each side, mandibles and base of the flagellum, rufo-ferruginous; the thorax above sometimes entirely fuscous, sometimes having three fuscous stripes; the claw joint of the tarsi fuscous; the extreme base and apex of the abdomen more or less ferruginous.

Worker.—Length 3—3½ lines. Resembles the *F. rufa*, but has the scape of the antennæ more slender and not thickened at the apex, the flagellum is also more slender; the angular shape above the clypeus is opaque, in *F. rufa* it is polished; the face black above

the insertion of the antennæ, in *F. rufa* it is red on each side as high as the vertex of the eyes: in small individuals, the entire thorax above, the scale above, and the tibiæ and tarsi above, are more or less fuscous; the margins of the segments of the abdomen are sometimes rufo-piceous, the tip of the abdomen pale.

Male.—Very closely resembles *F. fusca*, but differs from it in the form of the scale, which is transverse, its superior margin being emarginate the entire width; the angles of the emargination are oblique, the sides being straight—in *F. fusca* the scale is subrotundate and slightly emarginate above; the antennæ are more slender, the scape longer, and the face less produced before the eyes than in *F. fusca*.

This species may be very correctly called a mining Ant; it constructs its subterranean dwelling, consisting of long tortuous passages, in banks, preferring those in which there is a mixture of clay. It is found in the London district, but is much more local than *F. fusca*; I have also found it in the Isle of Wight, at Blackwater, Hants, at Weybridge and Southend; but it is not a very generally distributed species, being confined to particular localities. I have found all the sexes in the *Formicarium* in the month of August.

Sp. 4. *Formica fusca*.

Fœmina.—Fusco-nigra, nitida, cinereo-micans, mandibulis rufescentibus; scapis antennarum pedibusque rufo-testaceis; alis hyalinis, nervis et stigmatibus fuscis; squama lata subtriangulariter subrotundata; abdomine ovato, sub-nudo.

Operaria.—Nigra, nitida, valde cinereo-micans; mandibulis, antennarum scapis, flagellorum basi et pedibus rufo-piceis; femoribus apice rufo-pallidis; squama triangulariter subrotundata, supra leviter emarginata.

Mas.—Fusco-niger, nitidus, cinereo-micans, antennis et pedibusque pallide rufescentibus; squama subrotundata, margine supra emarginata.

Formica fusca, Linn. Faun. Suec., p. 226, 1722; Syst. Nat., i. 963, 4; Fabr. Ent. Syst., ii. 352, 11; Syst. Piez., p. 399, 13; Latr. Hist. Nat. Fourm., p. 159, t. 6, f. 32, ♂, ♀, ♂; Huber, Rech. Fourm., tab. 2, fig. 8 ♀, 9 ♂, 10 ♂; Jurine, Hym., p. 272; Zett. Ins. Lapp., p. 448, 4; St. Farg. Hym., i. 205, 6; Nyland. Adno. Mon. Form., p. 919, 15; Foerster, Hym. Stud. Form.

Female.—Length $3\frac{1}{2}$ lines. Fuscous, the head and thorax densely covered with a short fine cinereous pile; the head as wide as the thorax, the scape and base of the flagellum rufo-testaceous; the mandibles fusco-ferruginous; the anterior margin of the clypeus entire: the wings hyaline, the nervures testaceous, the stigma fuscous; legs pale rufo-testaceous, the base and apex of the joints palest. Abdomen ovate, shining and nigro-æneous; sparingly covered with a thin cinereous pile, not visible in long disclosed specimens, the extreme apex ferruginous: the apical margins of the second and third segments narrowly and obscurely rufo-piceous.

Worker.—Length $2-2\frac{1}{2}$ lines. Nigro-fuscous, thinly covered with a fine cinereous pile, the antennæ and mandibles as in the female, the clypeus having in the centre an indistinct longitudinal carina; the thorax of the same form as in *F. rufa*; the scale large, rounded at the sides, and very faintly and minutely notched above; the legs as in the female, the abdomen more globose.

Worker (minor).—The small worker has the antennæ and legs usually much paler than the worker (major).

Male.—Length $3\frac{1}{2}$ lines. Nigro-fuscous, shining and elongate; the scape obscurely testaceous; the tips of the mandibles ferruginous; legs pale rufo-testaceous; the coxæ at their base, and the claw-joint of the tarsi, fuscous. Abdomen subæneous; the margins of the segments slightly rufo-piceous, and submembranaceous; the scale thickened, rounded, and widely emarginate above, very closely resembling the male of *F. cunicularia*.—For the differences see that species.

Sp. 5. *Formica fuliginosa*.

Fœmina.—Nigra, nitidissima; antennis pedibusque pallide rufescentibus; mandibulis rufescentibus; capite magno, subcordato; squama parva, angusta, apice rotundata; marginibus lateralibus sub-parallelis: alis hyalinis, basi ad medium brunnescentibus, nervis et stigmatibus flavido-cinerascentibus.

Operaria.—Piceo-nigra, nitidissima; palpis, antennarum flagellis fere totis tarsisque pallide rufescentibus, tarsis tamen dilutioribus; capite magno sub-cordato; ocellis minutis: clypeo sub-carinato: squama parva subovata, marginibus lateralibus parallelis.

Mas.—Piceo-niger, nitidus; corpore toto sparse pilosulo; articulis pedum et tarsis dilutioribus; occipite concaviusculo; squama exigua sub-quadrata, parum rotundata, alis sicut in fœmina.

Formica fuliginosa, Latr. Hist. Nat. Fourm., p. 140, tab. 5, fig. A—D, ♂, ♀, ♂; St. Farg. Hym., i. 200, 2; Jurine, Hym., p. 273; Losana, Form. Pied., No. 9; Nyland. Adno. Mon. Form., p. 915, 12; Foerster, Hym. Stud. Form., p. 38, 17.

Female.—Length $2\frac{3}{4}$ lines. Of a shining deep nigro-piceous colour; mandibles ferruginous; clypeus smooth and shining; ocelli distinct and glassy; the eyes have a short scattered pubescence; antennæ, palpi and legs testaceous, having a cinereous pilosity; wings hyaline, the basal half smoky; the scale small, oblong, rounded and ciliated above; abdomen oblong ovate, as long as the thorax, about the same width as the head, the apical segment pilose, the extreme apex testaceous.

Worker.—2 lines. Resembling the female, the legs being darker; the scape and apex of the joints of the flagellum fuscous; the mandibles obscure ferruginous; the ocelli very minute; the scale minute, abdomen scarcely as wide as the head, sub-ovate, the extreme apex pilose.

Male.—2 lines. Coloured as in the female; mandibles reddish brown, broadly dilated at their apex; the flagellum and tarsi pale testaceous; the scutellum and metathorax very smooth and shining, wings as in the female: abdomen sub-conical, rounded at the base, pointed at the apex, having some thinly scattered long pubescence.

This species is distributed in all parts of the country, its usual habitat being in decaying trees, posts, &c., in which it forms its tortuous galleries; the perforations are stained black, probably by a peculiar acid discharged by this species. When the *F. rufa* takes up its abode in an old decayed tree all its galleries are of the original colour of the wood, thus proving some peculiarity in the present species. As I observed before I found a colony of this Ant in a sandy bank at Southend. I have found the males and females at the end of July and beginning of August, but I have met with a male in October.

Sp. 6. *Formica umbrata*.

Fœmina.—Nitida, cinerascens-sericea, pilis brevibus adpersis, pallido-fuscis; partibus oris, antennis, pedibusque pallide testaceis; capite thorace paululum latiori; oculis hirtulis; alis albescenti-hyalinis a basi fere ad medium fusco-umbratis, nervis brunnescentibus, stigmatibus fusco; squama subpentagonali, apice late obtuse-angulatum emarginato.

Operaria.—Pallide rufo-flavescens, oculis parvissime hirtulis; pube corporis sericea subtiliori, pilis brevibus erectis sparsis paullo brevioribus, rigidiusculis.

Mas.—Fusco-niger, nitidus; tenuissime cinerascens-sericeus et pilosulus; palpis, antennarum flagellis, pedum articulis tarsisque testaceo-pallescentibus; capite sat magno, paululum latiori thorace; oculis hirtulis; alis albescens-hyalinis; squama petioli subovali apice subangulatim emarginato.

Formica umbrata, Nyland. Addit. Adno. Mon. Form., p. 1048, 17; Smith, Append. Cat. Brit. Hym., p. 116; Foerster, Hym. Stud. Form., p. 39, 18.

Formica brunnea, Smith, Cat. Brit. Hym. p. 2, 4.

Female.—3-3½ lines. Fusco-testaceous, densely covered with a fine cinereous sericeous pile: head a little wider than the thorax, mandibles rugose, rufo-testaceous; the antennæ, the face beneath their insertion, and the legs, pale rufo-testaceous; the eyes thinly covered with short erect hairs; the head posteriorly deeply concave; the basal half of the wings brown; the scale oblong, nearly straight above, the lateral angles rounded, legs stouter and shorter than in *F. flava*: abdomen ovate.

Worker.—Very closely resembling *F. flava*, but is rather larger; the eyes are pubescent, and the scape stouter.

Male.—1½ lin. Resembles *F. flava*; but the eyes are pubescent, the scale emarginate above, and the wings usually clouded at their base; the basal joint of the flagellum stouter and more globose than in *F. flava*.

This species bears a close resemblance to *F. flava*, but is easily distinguished from it, the eyes being pubescent: this cannot be seen unless a high microscopic power be used, then it is visible in all the sexes. The female may be known, if winged, by having the wings brown at their base; if not winged, the size of the head will distinguish it; in *umbrata* it is wider than the thorax, in *flava* it is narrower; the workers are difficult to separate, the head is larger, more shining, and is not covered with a dense pile as in *flava*; the scape also is less attenuated at the base and altogether stouter: the ocelli are very distinct. Of the male, I have only seen a single specimen, this has the nervures fuscous, and the wings smoky at their base; the scale is notched and the eyes pubescent. Nylander says the wings are sometimes hyaline, sometimes smoky at their base; and the scale distinctly emarginate.

I have frequently found the female of this species on Hampstead Heath, but I have not been successful in discovering its *Formica*-

rium; Mr. Dale has taken all the sexes, and from his specimens I have described the female and worker; the male is from Lewes, near Brighton.

Sp. 7. *Formica flava*.

Fœmina.—Pallide fusca, dense flavido-sericea, antennis pedibusque pallide testaceo-cinerascentibus; alis hyalinis, versus basin parum infuscatis, nervis et stigmatate flavido-cinereis; squama subovali, supra late obtuse angulatim emarginata.

Operaria.—Flavo-testacea, lata, nitida, sericeo micans sparseque flavido-pilosula; oculis minutis atris ovalibus, ocellis minutissimis; squama parva subovali, supra rotundata vel truncata.

Mas.—Fuscus, nitidissimus; palpis, antenarum flagellis, pedum articulis et tarsis flavido-testaceis; flagellorum articulo primo crassiusculo; fronte media levissime transversim subimpressa; alis subhyalinis, nervis pallide testaceis, quandoque pallide fusciscentibus; squama subquadrata.

Formica flava, De Geer, Ins., ii. 1089, 5, tab. 42, fig. 24; Fabr. Ent. Syst., ii. 357, 34; Latr. Hist. Nat. Fourm., p. 166, tab. 7, fig. 36, ♂ ♀ ♂; St. Farg. Hym., i. 408, 9; Losana, Form. Pied., 17; Nyland. Adno. Mon. Form., 922, 17; Foerster, Hym. Stud. Form.

Formica rubra, Zett. Ins. Lapp., p. 450, 8.

Female.—Length 3 lines. Pale fuscous, the face below the insertion of the antennæ, the palpi, antennæ, scale and legs, of a pale testaceous-yellow; the mandibles usually rather inclined to ferruginous; the teeth which arm their apex and the superior margin of the abdominal scale fuscous; the body densely clothed with a fine yellow cinereous pile; the head not so wide as the thorax, the clypeus very convex, smooth and shining; wings hyaline, sometimes faintly smoky towards their base. Abdomen oblong-ovate, having a fine silky pile; as long as the head and thorax, the margins of the segments narrowly pale testaceous.

Worker.—Entirely pale yellow, the mandibles pale ferruginous, the eyes small and black; in small individuals the ocelli are obsolete, or not distinguishable without a high microscopic power, in larger individuals distinctly visible: head behind slightly concave; the scale subovate, its superior margin nearly straight; abdomen beneath having usually a dark fuscous spot, obsolete in some individuals, after death particularly, but usually present in living ones.

Male.—Dark fuscous, shining, having a sparing cinereous pile, most dense on the head and abdomen; the clypeus smooth and

shining, having a transverse depressed line at its anterior margin; the eyes and ocelli prominent, the latter has the posterior pair elevated on the vertex; wings hyaline, the nervures pale testaceous; the scale nearly square: abdomen slightly pubescent and pointed at the apex.

The female of *F. flava* is very likely to be confounded with the female of *F. nigra*; it may be distinguished by the form of the discoidal cell, which is much narrowed towards the first cubital cell, in *fusca* it is slightly narrowed, or subquadrate; the wings of *fusca* are different, being milky-white; the abdominal scale is also very different to that of *fusca*.

The male of *F. nigra* may be distinguished by its amplitude of wings, which are $2\frac{1}{2}$ lines long, those of *flava* are $1\frac{3}{4}$ lin.

This is probably the most universally distributed species in this country; it is found everywhere, and is well known as the turf Ant; it raises its nests in fields and on banks, and abounds in some of our open moor lands to an incalculable extent.* By diligent search I have little doubt that its two congeneric species, *F. umbrata* and *F. affinis*, will prove to be of frequent occurrence. This Ant constructs its *Formicarium* under stones in fields; and here will be found the interesting *Claviger foveolatus*, in societies formed in banks; its detection is difficult: we are only on the threshold of our investigations of these interesting insects, and some future Monographist will probably double the number of the species at present known to be indigenous.

Sp. 8. *Formica nigra*.

Fœmina.—Fusco-nigrescens, dense undique cinereo-micans, nitida, mandibulis antennis obscure rufescentibus; pedum articulis tarsisque pallide rufescentibus; alis lacteo-albis, nervis et stigmatibus pallide testaceis; squama verticaliter subrectangulari, supra angulis rotundatis et medio subangulatim emarginato.

Operaria.—Fusco-nigra, cinereo-micans, nitida, sparse flavido-pilosula, antennarum scapis et mandibulis rufescentibus; tarsis, pedum articulis pallide testaceis; squama subrectangulari, supra parum vel vix emarginato.

Mas.—Fusco-niger, parum cinereo-micans, nitidus; antennarum flagellis fusciscentibus, articulo primo crassiusculo; squama parva, transversim subrectangulari, supra parum concaviuscula.

* I have found the winged male in the *Formicarium* as late as the 5th of November.

Formica nigra, Linn. Faun. Suec., p. 426, No. 1722; Syst. Nat., i. 963, 4, ♀; Scop. Ent. Carn., p. 834; Fabr. Ent. Syst., ii. 350, 10; Schrank, Ins. Aust., p. 823; Latr. Hist. Nat. Fourm., p. 156, ♂, ♀, ♀; St. Farg. Hym., i. 206, 7; Losana, Form. Pied., 11; Nyland. Adno. Mon. Form. p. 920.

Formica fusca, Foerster, Hym. Stud. Form.

Lasius niger, Fabr. Syst. Piez., p. 415, 1.

Female.—Length $3\frac{1}{2}$ lines. Fuscous, densely covered with cinereous silky pubescence; the head shining; the mandibles, anterior margins of the face on each side of the clypeus, the flagellum and legs rufo-testaceous, the tarsi and joints of the latter palest; the ocelli distinct, and of a glassy brightness, eyes sparingly pilose; the head is narrower than the thorax. Thorax smooth and shining; wings of milky whiteness, hyaline and iridescent, the nervures of a testaceous yellow, costal nervure fuscous; the scale deeply notched above, the lateral angles rounded, the sides nearly straight. Abdomen elongate-ovate, rather longer than the head and thorax; the margins of the segments membranaceous, and narrowly pale testaceous; the silky gloss varying in brilliancy in different lights.

Worker.—Length $1\frac{1}{4}$ — $1\frac{1}{2}$ lines. The head and legs coloured as in the female; eyes not prominent, the ocelli very minute, scarcely distinguishable without a high microscopic power; in small individuals, the thorax similar in form to *F. flava*, abdominal scale small, vertical and subrectangular, minutely notched above. Abdomen ovate, thinly sprinkled with yellow hairs, particularly the apical segments; the margins of the segments obscurely membranaceous, shining and thinly sprinkled with long hairs beneath.

Male.—Length $1\frac{3}{4}$ lin. Dark fuscous, the tubercles at the base of the scape of the antennæ and the tips of the mandibles rufo-testaceous; the basal joint of the flagellum short, obconical, much stouter than the following joints; eyes and ocelli prominent, the vertex slightly concave. The wings, as in the female, more ample than in *F. flava*, the discoidal cell frequently obsolete; the scale small, scarcely emarginate above. Abdomen ovate, the margins of the segments narrowly and obsoletely testaceous.

This Ant is best known in England as the garden Ant; it forms its nest usually in the ground, but not uncommonly in old brick walls, &c.; it is found in woods, fields, gardens, and even in the middle of towns, where I have frequently observed the pave-

ment covered with the glittering winged males and females; and I once noticed some swallows skimming along the pathway, feasting on the Ants, when swarming as I have stated above.

Genus *TAPINOMA*, Foerst.

Maxillary palpi 6-jointed, labial palpi 4-jointed; antennæ inserted in the middle of the face, filiform, eyes placed before the middle, a little within the sides of the head; the abdomen having a scale at its base, substituting the first segment, the scale oblong, decumbent, received into a fovea at the base of the abdomen.

Although the insects which form this genus partake of most of the characters of the genus *Formica*, still all the species which I have seen have the flagellum either filiform or subfiliform, and the decumbent scale forms, apparently, a gradual approach in form to the *Poneridæ*; I have therefore retained Foerster's genus. I am acquainted with five species; one, which appears to be undescribed, I have the pleasure of adding myself; it was captured by Mr. Dale in Wales.

Tapinoma erraticum.

Fœmina.—Nigro-fusca, cinerascens-micans, pilositate abdominis dorso vix conspicua; pedibus fuscis, tibiæ apice tarsisque rufescentibus; metathorace dorso abbreviato, squama oblonga, subrectangula, depressa, fovea basali segmenti secundî recepta, vix conspicua; abdomine thorace latiori ventreque pilositate longiori et magis conspicua prædita.

Operaria.—Nigra, nitida, glabra, angustior, palpis et pedibus fuscis, geniculis tarsisque rufo-pallidis; squama sicut in fœmina; abdomine subrotundato.

Mas.—Niger, nitidus, antennis thorace longioribus; mandibulis multidentatis, apice acutissimo, pedum articulis tarsisque pallide rufescentibus; squama crassa, oblonga, supra rotundata; alis fusco-hyalinis; abdomine oblongo-ovata.

Formica erraticum, Latr. Hist. Nat. Fourm., p. 182.

Formica glabella, Nyland. Addit. Adno. Mon. Form., p. 38 ♂.

Tapinoma collinum, Foerster, Hym. Stud. Form., 43, 21, Gen. 2, ♀, ♂.

Female.—Length 2 lines. Not yet found in this country, the above diagnosis is from Foerster's Monograph.

Worker.—Length 1½ lin. Black, elongate, smooth and shining, not pubescent; the scape obscurely ferruginous towards the base, the extreme base of the flagellum rufo-testaceous; the teeth of the

mandibles ferruginous; ocelli not apparent; eyes round, the facets of a crystalline brilliancy. Thorax compressed, metathorax very oblique, smooth and shining, the scale small, elongate, inclining forwards, almost decumbent; legs dark rufo-testaceous, the joints and tarsi pale testaceous; abdomen sub-ovate, produced anteriorly, overhanging and concealing the scale.

Male.—Length 2 lines. Black, the antennæ elongate, reaching to the apical margin of the first segment of the abdomen, the first joint of the flagellum scarcely thicker than the second, all the joints of about equal length, the second and third a little longer than the basal joint; the ocelli prominent, of a glassy brightness, the clypeus convex, the mandibles produced, very stout, the inner margins straight and serrated, their apex terminated by an acute stout incurved tooth. Thorax elongate, rounded anteriorly, smooth and shining, the metathorax rounded posteriorly, sub-opaque, and having a depression or fossulet in the middle above; legs dark rufo-testaceous, the joints and tarsi pale testaceous; wings fusco-hyaline, nervures and stigma fusco-testaceous; scale of the abdomen decumbent, incrassate, rounded at its superior margin, not concealed as in the worker; abdomen elongate-ovate, margins of the segments narrowly and obscurely testaceous.

The insect which I have described as the male I think must be correctly assimilated. The worker and male were both captured by J. C. Dale, Esq., in 1816; the workers in Scotland, the male at Bournemouth. This is a very interesting addition to our *Fanna*, quite a new form, approaching somewhat to that of *Ponera*, through which we pass to the division which have two nodes to the abdomen, constituting the family *Formicidæ*; the habit of *F. collina* also approaches to that of our British representative of the group *Poneridæ*—*P. contracta*—which is found usually under stones, in which situation Mr. Dale informs me he met with the present species. I have only seen two workers and one male, all captured by and in the collection of Mr. Dale.

Tapinoma polita, n. s.

Operaria.—Rufo-testacea, antennis filiformibus; lævis, tota nitidissima, nuda; antennis, mandibulis, pedum articulis et tarsis pallide testaceis.

Worker.—Rufo-testaceous, smooth and shining; head elongate, the sides slightly curved or rounded, having a few scattered long hairs, slightly emarginate behind; the scape as long as the head,

and of about the same length as the flagellum, the latter nearly filiform, the two apical joints being only slightly thickened. Thorax: smooth and shining, rounded anteriorly, slightly narrowed posteriorly, and strangulated at the junction of the meso- and metathorax, the latter emarginate behind, the emargination extending the entire width, the lateral angles obtuse; the scale of the abdomen decumbent, elongate, slightly narrowed at the base and rounded above. Abdomen ovate, smooth and shining, sprinkled with a few long pale hairs.

The only species which approaches this insect is the *Tapinoma nitens* of Mayr; but that has the scape shorter than the flagellum, and the latter is sub-clavate, the scale is much wider above, and the abdomen dark rufo-fuscous. I have only seen the single example described; it is in the collection of J. C. Dale, Esq., who captured it in Wales.

Fam. 1. PONERIDÆ, Smith.

Genus PONERA, Latr.

Head elongate, flagellum of the antennæ clavate in the females and workers, filiform in the males; inserted before the middle of the face: the maxillary palpi short, subsetaceous, 6-jointed, the labial palpi 4-jointed; the clypeus short, transverse; the ocelli and eyes obsolete in the workers; wings having one marginal, two sub-marginal and two discoidal cells; the abdominal scale sub-nodiform, incrassate; the margins of the second and third segments constricted.

Sp. 1. *Ponera contracta*.

Fœmina.—Elongata, sub-cylindrica, fusca; mandibulis, clypeo, antennis pedibusque pallide rufis; oculis magnis, subovalibus, hirtulis; ocellis distinctis; capite magno, confertim punctulato, sub-opaco; alis hyalinis, nervis subflavescentibus: squama altissima, crassa, antice convexa, postice lævissima concaviuscula; abdomine elongato-ovali, margine parum fusco-testacea.

Operaria.—Fusco-brunnea, sub-nitida, pube cinerascenti subdepressa, pilis sparsis erectis; oculis obsoletis, ocellis nullis.

Mas.—Niger, nitidissimus, pube sericea; pedibus fuscis, tibiis tarsisque rufescentibus; antennis elongatis, scapo minimo, pedicello subgloboso, reliquis articulis cylindricis; oculis valde prominulis, ocellis sat magnis; abdominis segmento primo squama crassa, antice posticeque subconvexa; segmento ultimo processu spiniformi deorsum flexo; alis ut in fœmina.

Formica contracta, Latr. Hist. Nat. Fourm., 195, tab. 7, fig. 40, ♀; Fabr. Syst. Piez., p. 410, 58.

Ponera contracta, Latr. Gen. Crust. et Ins., iv. p. 128; St. Farg. Hym., i. 195, 8; Steph. Illus. Brit. Ent. Supp., p. 15, tab. 42, fig. 2; Foerster, Hym. Stud. Form., p. 45.

Female.—Length $1\frac{2}{3}$ lin. Elongate, subcylindrical, shining rufo-fuscous; the antennæ, clypeus and mandibles rufo-testaceous; the eyes large and ovate, situated anteriorly at the sides of the head, opposite the insertion of the antennæ, which approximate at their base; the ocelli placed in a triangle on the vertex; a longitudinal impressed line extends from the anterior stemma to the base of the antennæ; the vertex slightly emarginate its entire width. Thorax elongate, the sides nearly parallel, rounded anteriorly; the metathorax sub-truncate, very slightly oblique; the scutellum, post-scutellum and legs, rufo-testaceous, the tarsi palest; wings having one elongate marginal cell, two elongate submarginal, and one discoidal cell. Abdomen, the node incrassate, vertical, rising above the base of the following segment, rounded above; the margins of the second and third segments constricted; the extreme apex pale rufo-testaceous.

Worker.—Black, or dark fuscous; elongate and sub-cylindrical; smooth and shining; head elongate, wider than the thorax, very finely and closely punctured; eyes and ocelli wanting; the face below the insertion of the antennæ, the latter, as well as the legs and extreme apex of the abdomen, rufo-testaceous; the mandibles large and triangular, their inner edge very finely denticulate; the flagellum clavate; the prothorax convex, rounded anteriorly, behind which the thorax is compressed; the metathorax slightly oblique: scale of the abdomen thickened, broad, and rounded above; the margins of the two following segments constricted, the first most strongly so; the margins obscurely rufo-testaceous; the apex pale rufo-testaceous.

This insect was discovered to be indigenous by Mr. J. O. Westwood, who captured it in St. James's Park.

I only possess the worker and female; the diagnosis of the male is from a foreign specimen. *P. contracta* is rare in this country; its communities being small and their living under stones and other substances, as well as their minute size, combine to render their detection difficult. I have never seen the insect alive.

Fam. 2. MYRMICIDÆ, Smith.

Genus MYRMICA, Latr.

Manica, Jurine.

This genus of ants is separated from *Formica* by very essential characters, which consist of the following differences: the abdomen has its two basal segments contracted into two nodes, the females and workers are armed with stings, and the pupæ are not enclosed in cocoons, but cast off a thin pellicle, like the pupæ of many Fossorial *Hymenoptera*; their labial palpi are 4-jointed, their maxillary palpi 6-jointed.

The males and females winged, the latter temporarily so. The males and females furnished with ocelli, which are wanting in the workers.*

Sp. 1. *Myrmica scabrinodis*.

Fœmina.—Rufo-testacea, sparse flavido-pilosula; capite supra, scutello abdominisque dorso medio fusciscentibus; scapo ad basin arcuatim flexo: capite, thorace et petiolo longitudinaliter striatis, profunde rugosis; metathorace spinis longiusculis; alis hyalinis, versus basin parum infuscatis, stigmatibus ejusdem coloris distincto.

Operaria.—Rufo-testacea, sparse flavido-pilosula, capite supra, abdominisque dorso medio fusciscentibus; capite, thorace et petiolo longitudinaliter striatis, profunde rugosis; antennarum scapo ad basin arcuatim flexo, flexura supra angulata: metathoracis spinis longis.

Mas.—Nigro-fuscus, nitidus, sparse tenuiter flavido-pilosulus; mandibulis, pedum articulationibus tarsisque testaceo-pallescentibus; antennis fusco-rufescentibus; scapo longitudine quintæ partis totius antennæ; abdominis apice pallide rufescentibus.

Myrmica scabrinodis, Nyland. Adno. Mon. Form., p. 930, 3,
♂, ♀, ♀; Foerster, Hym. Stud. Form.,
66, 36.

Myrmica rubra, Curtis, Trans. Linn. Soc., xxi. 213, 1.

Myrmica cœspitum, Zett. Ins. Lapp., 450, 1 ♂.

Female.—Length $2\frac{1}{2}$ lines. The head above and the clypeus fuscous; beneath, the sides, the face on each side of the clypeus,

* None of the British species of the genus *Myrmica* spin a cocoon, and this appears to be the case with the majority of the *Myrmicidæ*; but the genus *Myrmecia*, Fabr., is an exception to the rule. I possess the pupa, and silken cocoon from which it was extracted, of a species closely allied to *M. gulosa*, from New Holland.

the mandibles, and the antennæ, rufo-testaceous; the scape stout, of nearly equal thickness the entire length, and bent at the base, the curvature produced in front into a sharp angle; the head and thorax above, rugose-striate; the spines which arm the meta-thorax long, stout, and acute at their apex; the nodes of the abdomen coarsely rugose; the wings hyaline, faintly coloured towards their base; the nervures and base of the stigma rufo-testaceous. Abdomen subovate, smooth and shining, dark fusco-ferruginous, the base and apex pale ferruginous, thinly sprinkled over with shining yellow hairs.

Worker.—Length $1\frac{1}{2}$ —2 lines. The sculpture as in the female; the ocelli obsolete, the general colouring usually paler, particularly the head and thorax; the head perhaps scarcely so deeply striated; the scape is bent and angulated in the same manner as in the female; the thorax is more compressed at the sides, being narrower towards the metathorax than in the female; the nodes as in that sex, the legs rather more slender; the abdomen proportionably smaller.

Male.—Deep nigro-fuscous; the apical joints of the flagellum, the tubercle at base of the scape, the mandibles, the apex of the femora and the tarsi, pale rufo-testaceous; the mandibles usually pale yellow; the scape short and stout, about one-fifth of the entire length of the antennæ; the antennæ and legs thinly sprinkled with pale glittering hairs; the wings smoky towards their base. Abdomen smooth and shining, pale testaceous at the apex, the nodes shining above, the anterior one has a shining depression behind; the metathorax is deeply notched and produced into an angulated process on each side, the scutellum and sides of the metathorax striated; the entire insect sprinkled with pale glittering hairs.

This is a very abundant species: it is found in all parts of the kingdom, and is frequently met with, occupying one side of the same hillock in which *Formica flava* has formed its habitation; it is met with in great profusion in hilly districts, forming its subterranean channels under stones; in the nest of this insect I met with a specimen of *Batrisus formicarius*, in Yorkshire.

Sp. 2. *Myrmica ruginodis*.

Femina.—Testaceo-ferruginea, sparse flavido-pilosa, capite supra, abdominis dorso medio, scutello et macula ventrali plus minusve fusciscentibus; scapo ad basin arcuatim flexo; capite, thoraceque longitudinaliter striatim-rugosis; metathoracis spinis

longiusculis ; alis hyalinis, nervis cum stigmate sub-flavescentibus ; nodis petioli rugosis.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula ; capite supra abdominisque dorso medio et macula ventrali plus minusve fusciscentibus ; scapo basin versus arcuatim flexo ; capite thoraceque longitudinaliter striatim-rugosis ; metathoracis spinis binis validiusculis longis ; nodis petioli rugosis.

Mas.—Nigro-fuscus, nitidus, parcissime tenuiter flavido-pilosulus ; mandibulis, articulationibus pedum et tarsis testaceo-pallescentibus ; scapo elongato, fusciscente, abdomine supra obscure rufescente.

Myrmica ruginodis, Nyland. Adno. Mon. Form., 929, 2 ; Foerster, Hym. Stud. Form., p. 66, 36.

Myrmica vagans, Curtis, Trans. Linn. Soc., xxi. 213, 3.

Female.—Length $2\frac{1}{2}$ lines. This sex so very closely resembles that of the preceding, that it is only necessary to point out the distinctions of the present species. The scape is more slender, gradually narrowing to the base, which is bent, but not angulated in front of the arcuation ; the flagellum is also more slender, and the joints rather longer ; the mesothorax is not so deeply rugose-striate, and the thoracic spines are not quite so stout and are more bent inwards towards each other.

Worker.—Differs from that of the preceding species in the same characteristics as the female.

Male.—At once distinguished from that of the preceding species by having the antennæ rather longer than the thorax, the scape being about one-third of their entire length ; they are usually also paler coloured, and the entire insect is less pilose, particularly the head and legs ; the tarsi are more elongate and slender ; the metathorax is less deeply notched, and sub-angulated laterally.

This is in all probability the species described by Linnæus as *Formica rubra*, since it usually possesses the character pointed out by the author, “punctum nigrum sub abdomine ;” but, as I have observed this character in some examples of other species, I have not thought myself warranted in changing the name : the species is equally abundant with the foregoing, and found in similar situations.

Mr. Curtis quotes this species as being the *Formica vagans* of Fabricius, but the description of that author would equally well

suit either this, the preceding, or following species; therefore until the typical specimen can be examined I retain Nylander's name for the species.

Sp. 3. *Myrmica levinodis*.

Fœmina.—Sordide testaceo-ferruginea, sparse flavido-pilosula; capite, pronoto, scutello abdomineque supra et infra in medio fuscescentibus; capite thoraceque longitudinaliter striatim-rugulosis; metathorace spinis brevibus validiusculis: nodis petioli sublævibus; alis hyalinis.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula, capite supra abdominisque dorso medio et macula ventrali plus minusve fuscescentibus; capite et thorace longitudinaliter striatim-rugulosis; metathorace spinis binis validiusculis; nodis petioli sublævibus.

Mas.—Nigro-fuscus nitidus, sparse flavido-pilosulus; mandibulis tarsisque pallide testaceis; antennis scapo valde elongato, metathorace inermi, tuberculis utrinque sub-obsoleteis; antennis, trochanteribus, tibiis abdomineque plus minusve conspicue fusco-pallescentibus; alis hyalinis, basin versus obsoleteissime subfuscescentibus.

Myrmica levinodis, Nyland. Adno. Mon. Form., p. 927, 1;
Foerster, Hym. Stud. Form., 46, 35;
Curtis, Trans. Lin. Soc., xxi. 213, 2.

Female.—Length $2\frac{1}{2}$ lines. Fusco-testaceous: the head dark fuscous, the mandibles and antennæ pale testaceous, the apical joints more or less ferruginous; the thorax above usually rufo-testaceous, sometimes only the scutellum; the metathoracic spines short, stout and acute, slightly divergent; wings hyaline, the nervures pale rufo-testaceous, the stigma slightly fuscous; the anterior node smooth and shining above, posteriorly, as well as the second node, obsoleteily roughened. Abdomen smooth and shining, more or less fuscous above, and having sometimes a fuscous spot beneath; the scape of the antennæ attenuated at the base, and slightly bent.

Worker.—Differs very slightly in any respect from the female, except in being smaller: the mandibles are ferruginous, and the nodes of the abdomen faintly rugose.

Male.—Length 2 lines. Dark fuscous, the head less shining than the thorax and abdomen, and obsoleteily rugose; the man-

dibles pale testaceous; antennæ rufo-testaceous, the scape above, and the three apical joints of the flagellum, slightly fuscous; ocelli of a glassy brightness, very prominent, as well as the eyes; thorax: the mesothorax very prominent, anteriorly smooth and shining, as well as the metathorax posteriorly, which is slightly notched and laterally sub-angulated; wings hyaline, nervures pale testaceous, the stigma slightly fuscous; the nodes and the abdomen very glossy, the apex of the latter pale testaceous; the articulations of the legs and the tarsi pale testaceous.

This species most closely approaches *M. ruginodis*; the female of the present species, however, may be distinguished by having the spines of the thorax smaller, being short angular processes, very acute at their apex, not bent spines, as in *M. ruginodis*; the smooth nodes will also serve to distinguish it. The worker has the spines longer than the female; the thorax is not so coarsely sculptured as in *M. ruginodis*, and the nodes are smooth and shining, the sculpture on them being very delicate. The male has the antennæ shorter than in *M. ruginodis*, and intermediate, as it were, between *M. ruginodis* and *M. scabrinodis*; the scape is about one-third of the entire length.

This species does not appear to be so abundant as either of the foregoing; I have only met with it in Sandown Bay, and in Luccomb Chine, Isle of Wight; Mr. Baly found it at Folkestone; I suspect it is a local species in this country.

Sp. 4. *Myrmica sulcinodis*.

Fœmina.—Ferruginea, sparse flavido-pilosula, capite et abdomine fusco-nigrescentibus; mandibulis, antennis, thorace pedibusque pallido-ferrugineis; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; antennarum scapo ad basin parum subcurvato; metathoracis spinis longis.

Operaria.—Sordide rubida, sparse flavo-pilosula, capite abdomineque fusco-nigrescentibus; mandibulis antennisque pallide rufescentibus; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; antennarum scapo ad basin parum curvato; metathorace spinis longis.

Mas.—Nigro-fuscus, nitidus, parcissime tenuiter flavido-pilosulus; mandibulis, antennarum flagellis, articulationibus pedum tarsisque pallide rufo-testaceis; alis hyalinis, nervis pallide testaceis; capite, metathorace supra, nodis segmenti primi longitudinaliter striatim-rugulosus.

Myrmica sulcinodis, Nyland. Adno. Mon. Form., p. 934, 5.

Myrmica perelegans, Curtis, Trans. Linn. Soc., xxi. 214, 5,
tab. 4, fig. 15 ♂, 16 ♀, 17 ♂.

Female.—Length $2\frac{1}{2}$ lines. Head and abdomen very dark rufo-fuscous: sometimes the latter is nearly black; the scape usually rather darker than the flagellum and slightly fuscous above, but at other times the antennæ are entirely rufo-testaceous; the legs also differ in being sometimes entirely pale-red, sometimes only the tarsi are pale, according to the maturity of the insect; the head is longitudinally roughly rugose; the thorax and nodes of the abdomen longitudinally rugose-sulcate: the spines of the metathorax elongate, acute, and curving slightly inwards; the scape is slightly curved at the base; the wings clear hyaline, the nervures and stigma pale testaceous; abdomen very glossy and sprinkled with pale glittering yellow hairs.

Worker.—Length 2 lines. Differs from the female scarcely in anything except size; the spines are however more erect, and the workers are usually darker in colour.

Male.—Length $2\frac{1}{4}$ lines. Dark fuscous, sometimes nearly black, the head longitudinally roughly rugose; the mandibles, flagellum, and apex of the scape, pale rufo-testaceous, the latter frequently fuscous above at the base, sometimes only slightly so; thorax above longitudinally sulcate, most deeply so on the metathorax above and at the sides; the metathorax sub-marginate behind, the posterior truncation smooth and shining; the joints of the legs, as well as the tarsi, pale rufo-testaceous; the wings of a pale yellow hyaline; the nervures and stigma pale testaceous; the apex of the nodes and of the abdomen pale rufo-testaceous.

This distinct species appears to be very local; I have never met with it. Mr. Dale has captured the male and worker in Wales, and I am indebted to Mr. Curtis for examples of the sexes taken at Bournemouth, Hampshire: the male is here described for the first time. Possessing several specimens of Nylander's species, presented by himself, and also others from M. Mayr, of Vienna, I have been unable to recognise the slightest difference between these and specimens presented by Mr. Curtis.

Sp. 5. *Myrmica denticornis*.

Fœmina.—Testacco-ferruginea, sparse flavido-pilosula; capite supra abdominisque dorso medio fusciscentibus; mandibulis et pedibus flavido-testaceis; alis hyalinis, nervis testaccis, capite

striatim rugosis; thorace et petiolo longitudinaliter striatis, profunde rugosis; antennarum scapo ad basin geniculatim flexo, geniculo supra acute denticulato.

Operaria.—Obscure rubida, sparse flavido-pilosula; cætera ut in præcedente.

Mas.—Fusco-pallidus, mandibulis pallide rufescentibus, thorace et petiolo sublævibus; alis sub-hyalinis, nervis et stigmatibus pallide fulvis.

Myrmica denticornis, Curtis, Trans. Linn. Soc., xxi. 215, 7, tab. 23, fig. 18, 19, ♂, ♀.

Female.—Head above, mesothorax, scutellum and abdomen, fusco-ferruginous; the metathorax and antennæ pale ferruginous; the scape, mandibles and legs pale rufo-testaceous; the mesothorax has on each side a longitudinal fuscous stripe uniting with a transverse one at the base of the scutellum; the scape is geniculated at the base, having at the upper angle an acute short tooth; the spines on the metathorax slightly divergent and curved slightly inwards, they are stout, long and acute.

Worker.—This strongly resembles the female in its sculpture, but is of an uniform dark fuscous red; the antennæ, mandibles and legs fulvous; the antennæ denticulate as in the female: in both sexes the first node of the petiole is ovate, the second globose, both being coarsely rugose.

Male.—Length $2\frac{1}{2}$ lines. Pale dull castaneous, sparingly pubescent, the head irregularly and indistinctly striated; mandibles straw-coloured; the antennæ and legs fulvous; coxæ, tips of the femora and the tarsi pale testaceous; the margin of the scutellum and the articulations of the nodes of the abdomen pale testaceous; the basal node a little elongated and irregularly striate, the second node as well as the disk of the thorax smooth and shining, the latter faintly sculptured; the spines on the metathorax are short and acute, slightly divergent: wings slightly tinted, the nervures and stigma pale fulvous.

Mr. Curtis has described the worker and male of this very distinct species; the female I describe from the collection of J. C. Dale, Esq., who captured it as well as the worker in Scotland; it is most closely allied to the *M. lobicornis* of Nylander, but on comparison with specimens of that insect presented to me by that author, it is immediately seen to be abundantly distinct.

Mr. Curtis captured this insect in Scotland in July, 1825, but did not find any females.

Sp. 6. *Myrmica longiscapa*.

Myrmica longiscapus, Curtis, Trans. Linn. Soc., xxi. 213, 4.

Mr. Curtis says, "this species resembles *M. lævinodis*, but the males are much smaller, the antennæ much longer, and instead of the scape being only as long as the two basal joints of the flagellum, as in *M. lævinodis* and *M. rubra*, it is equal in length to the eight following joints. The head is less convex, there is no channel down the forehead, and the clypeus is testaceous: there is a fovea on the hinder margin of the second nodule; the wings do not differ; the females are very similar to those of *M. lævinodis*, but they are darker, and the basal nodule is shorter and stouter. The neuters are smaller and different in colour from those of *M. lævinodis*, being entirely ochreous, excepting the black eyes and a brownish cloud on the back of the abdomen."

I do not possess this species, which must approach very closely to *M. lævinodis*; the figure of the nodes of the abdomen of the female, in profile, appear to characterize a distinct species; the characters of the male, however, are those of *M. lævinodis*, respecting which there is evidently, in the above quotation, some misconception; in my typical specimens, named by Dr. Nylander, the scape is equal in length to 7 or 8 of the basal joints of the flagellum, and Nylander's description is, "scapus tertiam partem totius antennæ fere excedens, longitudine prope articularum 7 sequenti flagelli." Nylander does not mention the fovea on the second nodule, but it exists in all his specimens—the females and workers of *M. lævinodis* are both characterized by the fuscous cloud on the back of the abdomen, which renders the affinity of these species the closer.

Sp. 7. *Myrmica cæspitum*.

Fœmina.—Fusco-nigra, nitida, flavido-pilosula; mandibulis, antenarum flagellis, articulationibus pedum tarsisque pallidis; capite, pleuris et metathorace longitudinaliter striatis opacis; metathoracis spinis mediocribus validiuseulis, obtusiuseulis; alis hyalinis, stigmatate cinereo-fusco.

Operaria.—Fusco-nigricans, sparse pallide pilosula; mandibulis, antennis pedibusque rufo-testaceis, articulationibus et tarsis

rufo-pallescens; capite thoraceque subtiliter longitudinaliter rugulosis; spinis metathoracis minutis dentiformibus; nodis petioli sublævibus.

Mas.—Niger, parcissime flavido-pilosulus; mandibulis, antennis pedibusque sordide pallescens, flagellis et tarsis dilute pallidis; capite parvo thoraceque subtiliter striatulis; thoracis marginibus anticis et lateralibus nitidis; alis hyalinis, nervis pallescens, stigmatibus pallide fuscis: spinis metathoracis nullis; nodis sublævibus.

Formica cæspitum, Linn. Faun. Suec., No. 1726 ♀; Syst. Nat., 963, 11; Latr. Hist. Nat. Fourm., p. 251, tab. 10, fig. 63 ♂.

Formica binodis, Amœn. Acad., vi. p. 413, 94 ♀; and Sp. in Cab. Mus. Linn. Soc.

Myrmica fuscula, Nyland. Adno. Mon. Form., 935, 6 ♂, ♀, tab. 18, fig. 36, ♂; Addit. Adno., p. 1053, ♀; Foerster, Hym. Stud. Form., p. 56, 29.

Myrmica cæspitum, Curtis, Trans. Linn. Soc., xxi. 215, 8.

Manica cæspitum, Jurine, p. 279.

Female.—Length $3\frac{1}{4}$ lines. Very dark fuscous, or quite black; the head narrower than the thorax, and longitudinally striate; ocelli of a glassy brightness; the mandibles and antennæ dark ferruginous; the scape, except the extreme apex, slightly fuscous, as well as the flagellum towards the apex, the apical joint paler; thorax somewhat flattened above, the mesothorax being on each side delicately and obliquely strigose; the scutellum finely strigose; the mesothorax has on each side, a little within and before the insertion of the wings, an abbreviated impressed line, and has in front a smooth shining space; the metathorax longitudinally rugose above, the lateral spines short, stout and sub-acute; the truncated portion of the metathorax below the insertion of the spines is transversely sulcate; the wings clear hyaline, the nervures very pale, the stigma pale fuscous; sometimes the wings are very faintly smoky at their base; the legs rufo-fuscous, their articulations, as well as the tarsi, rufo-ferruginous. Abdomen elongate ovate, rather broader than the thorax, and rather longer, the apical margins of the segments rufo-piccous; the first node is rugose, the second faintly roughened behind, the superior margin of both nodes smooth and shining.

Worker.—Length $1\frac{1}{4}$ —2 lines. The colour like that of the

female, but frequently paler, the legs being usually so; the head subquadrate, much wider than the thorax, and longitudinally striate, the mandibles and antennæ as in the female; the vertex is slightly concave behind, the angles being rounded; the thorax a little longer than the head, widest in front, finely longitudinally rugose-striate; the metathoracic spines short and acute; the nodes smooth and shining above, faintly strigose at the sides; the legs and abdomen as in the female.

Male.—Length $2\frac{1}{2}$ —3-lines. Dark fuscous, or black; head small, much narrower than the thorax, sub-opaque, longitudinally rugose-striate, ocelli glassy and bright; the mandibles, antennæ, joints of the legs and the tarsi, pale testaceous, the flagellum fuscous at the base. Thorax rounded and swollen anteriorly; on each side anteriorly is an oblique impressed line, meeting in the middle of the mesothorax; the angular shape thus formed is highly polished and impunctate; on each side before the insertion of the wings, about half-way between that and the oblique line, is an abbreviated impressed line; the centre of the thorax behind the angular shape in front is longitudinally striated; a shining space on each side surrounding the lateral impressed line; the scutellum transversely and very finely strigose; the metathorax longitudinally striate; wings hyaline, the stigma pale fuscous; the nodes obsoletely rugose. Abdomen ovate, smooth and shining; the apical margins of the segments pale rufo-testaceous.

The antennæ of the male have apparently only ten joints, but when viewed under a high power of the microscope, the third joint will be found to consist in reality of three joints; the fifth is composed of two, thus making the number really thirteen.

This is a local but abundant species on many parts of the coast; it appears to frequent such situations, I have not found it in any other; it is very plentiful at the back of the Isle of Wight, in Sandown Bay, Luccomb and Shanklin Chines; there are large colonies at Shoeburyness, below Southend, where in August I obtained all the sexes: Mr. Dale has taken it at Charmouth. I have little doubt of this being the *F. cæspitum* of Linnæus, as quoted by Latreille; it is certainly that of the latter author.

Sp. 8. *Myrmica acervorum*.

Fœmina.—Sordida, pallide rubida, sparse pilosula; capite, thorace abdomineque fusco-nigricantibus supra; capite longitudi-

naliter striatulo; alis totis albo-hyalinis, spinis metathoracis mediocribus; nodis parum scabris.

Operaria.—Sordide rubra, sparse pilosula; capite abdomineque supra fusciscentibus; capite longitudinaliter striatulo; thorace nodisque petioli rugoso-scabriusculis, metathorace spinis mediocribus.

Mas.—Niger, cinereo-pilosulus; tibiaram basi apiceque, tarsisque dilute pallidis, metathoracis apice polito, utrinque angulatum tuberculato; alis lacteo-hyalinis.

Formica accrvorum, Fabr. Ent. Syst., ii. 358, 38, ♂; Syst. Piez. p. 407, 50.

Myrmica accrvorum, Zett. Ins. Lapp., 451, 3, ♀, ♂; Nyland. Adno. Mon. Form., 936, 7, ♂, ♀, ♂; Foerster, Hym. Stud. Form., 61, 32; Curtis, Trans. Linn. Soc., xxi. 215, 6.

Myrmica lacteipennis, Zett. Ins. Lapp., p. 452, 5, ♂.

Female.—Length $1\frac{2}{3}$ lin. Head elongate, subquadrate; above the insertion of the antennæ, but not quite extending to the vertex, fuscous; the rest of the head pale ferruginous; the three apical joints of the antennæ fuscous; the thorax, legs and nodes pale ferruginous; the thorax indistinctly longitudinally striated, slightly fuscous at the insertion of the wings; spines of the metathorax short, stout and acute; the first node slightly roughened behind, the second smooth, or faintly sculptured. Abdomen oblong-ovate, dark fusco-ferruginous, pointed at the apex, and sprinkled with pale glittering hairs.

Worker.—Length $1\frac{1}{2}$ lin. This scarcely differs from the female in anything but size, except in the usual compression of the sides of the thorax, and in the absence of the ocelli; the spines are rather stouter and longer, and the second node is rather more distinctly sculptured with fine striæ.

Male.—Black, the tarsi and articulations of the legs pale testaceous; the entire insect is thinly clothed with long cinereous pubescence; the antennæ apparently 12-jointed; the palpi minute, pale testaceous; the mandibles truncate at their apex.

This, like most of the small species, is rarely met with. I once found a colony on Shirley Common, under the bark of a decaying tree; it consisted of one female and about fifteen workers. Mr. Dale has taken it in the New Forest, at Glanvilles Wootton, and at Lulworth. I have also received it from Scotland.

9. *Myrmica graminicola*.

Fœmina.—Rufo-pallida, sparse pilosula; capite et thorace supra longitudinaliter striatulo; alis totis albo-hyalinis: spinis metathoracis parvis dentiformibus; nodis sublævibus, primo elongato, secundo globoso.

Myrmica graminicola, Latr. Hist. Nat. Fourm., p. 255; Curtis, Trans. Linn. Soc., xxi. 216, 11.

Female.—Totally pale ferruginous: head elongate, subquadrate, strongly longitudinally rugose-striate; the scape slightly bent, tips of the mandibles fuscous; the thorax longitudinally rugose; the metathoracic spines short and acute; the wings hyaline, the nervures and stigma pale testaceous; the first node of the abdomen petiolate, not toothed beneath, the second node globose; the abdomen oblong ovate; the entire insect sprinkled with pale glittering hairs, rather thickly so on the head and abdomen.

Worker.—Length $1\frac{1}{2}$ lin. Rufo-testaceous: the head elongate, strongly longitudinally rugose-striate; eyes black, round and very minute; flagellum 11-jointed, gradually thickening from base to apex, the apical joint conical and acute; the head anteriorly, mandibles, antennæ and legs, pale ferruginous; thorax: narrow, elongate, strongly longitudinally rugose-striate; anteriorly rounded and widest, deeply strangulated at the junction of the meta- and mesothorax; the teeth on the metathorax short, acute and dentiform. The first node petiolate, the second rather wider than the first, globose, both are shining above; abdomen smooth and shining, pale testaceous at the base and apex.

Male.—Dark fuscous: shining and sparingly pubescent, the parts of the mouth and the tarsi pale ferruginous; the flagellum obscure reddish brown, the scape black; the head and thorax rugose; the metathorax oblique, smooth and shining, subdentate; the wings entirely dark fuscous, with the nervures black.

I have not seen the male of this species; the above description is compiled from Latreille. I have twice taken the female flying; once at Paddington, in the month of September, and a second example near London, but do not recollect the precise locality. A third winged female was captured by the late Mr. Wing, on the 4th of December, at Vauxhall. The scarcity of some species of *Myrmicidæ* is to be attributed to their peculiar economy, and also to their societies being few in number. As an example of the first, I refer the student to the remarks under *M. fugax*.

I feel pretty certain of this species being Latreille's, since it not only agrees in colour, but also in having the first node of the abdomen elongated into a petiole, and in not being toothed beneath.

Sp. 10. *Myrmica fugax*.

Operaria.—Minuta, pallide flavescens, lævis, nitida; antennarum clava flagelli biarticulata; metathorace declivi mutico, pedibus pallescentibus; abdomine medio supra subfasciatim fusciscente.

Formica fugax, Latr. Hist. Nat. Fourm., p. 265.

Myrmica flavidula, Nyland. Addit. Adno. Mon. Form., p. 43, 12?

Worker.—Length $\frac{3}{4}$ -1 lin. Head and thorax of a pale reddish yellow, the abdomen usually having a dark obscure fascia, and a similar spot on the front of the head, towards the insertion of the antennæ; sometimes entirely very pale yellow, particularly the smaller specimens. Head elongate, the sides nearly parallel, slightly widest at the eyes, which are very minute and black; the club of the flagellum composed of two joints, the apical joint thrice the length of the first, conical, and very acute at the apex; the antennæ slightly pubescent. Thorax: rounded anteriorly, slightly strangulated between the meso- and metathorax, the latter obliquely declined posteriorly, not having the slightest tubercle or tooth; the first node wider than the second, somewhat pear-shaped, the second globose; abdomen oblong-ovate, and the entire insect highly polished and shining.

I have not yet obtained British examples of the other sexes: I possess females sent to me by M. Mayr of Vienna; these very closely resemble the female of *M. cæspitum*, but are only $1\frac{2}{3}$ of a line in length, being of a very dark brown-black; the mandibles, antennæ and legs are pale rufo-testaceous, and the wings hyaline.

This minute species was not known as a British insect until the autumn of 1854, when I discovered a colony under ground, on the shore below Southend. The habit of the species appears to be subterraneous; I visited the spot daily at all hours, but never saw one above ground, but by digging I could always find them; visiting the spot at night was attended with the same results; some of the chambers, at the depth of six inches, contained pupæ of males and females, but I failed in bringing them to maturity in an artificial situation.

If this species be not identical with the *M. flavidula* of Nylander, it must be very closely allied.

Sp. 11. *Myrmica unifasciata*.

Fœmina.—Rufo-pallida, sparse setulosa, abdominis segmento secundo fusciscente; capite et mesothorace subtiliter longitudinaliter scabriusculis; alis hyalinis, nervis pallidis subobsoletis; spinis metathoracis minutis dentiformibus; nodis sublævibus.

Operaria.—Rufo-pallida, sparse setulosa; capite abdomineque fasciis fusciscentibus; capite longitudinaliter striato, thorace nodisque subtiliter rugoso-scabriusculis; spinis metathoracis mediocribus acutiusculis.

Mas.—Fusco-testaceus, nitidus; abdominis segmentis dilutioribus; metathorace tuberculis utrinque obsoletis; alis lacteo-hyalinis; nervis sub-obsoletis; antennis, palpis pedibusque pallide testaceis.

Formica unifasciata, Latr. Hist. Nat. Fourm., 257.

Myrmica unifasciata, Nyland. Addit. Adno. Mon. Form., p. 44; Curtis, Trans. Lin. Soc., xxi. 216, 12.

Manica unifasciata, Jurine, Hym., p. 279.

Female.—Length $1\frac{3}{4}$ lin. Rufo-testaceous: sprinkled with a few erect scattered hairs; the head finely longitudinally rugose-striate; the stemmata very prominent, and of a glassy brightness; the scape and base of the flagellum pale flavo-testaceous, the legs are of the same colour; antennæ apparently 12-jointed. Thorax rounded anteriorly, the mesothorax finely longitudinally striated; the insertion of the wings, the scutellum and post-scutellum, rufo-fuscous, the scutellum smooth and shining in the middle; the spines on the metathorax short and acute; the wings hyaline, the nervures scarcely discernible; the nodes nearly smooth, shining, the first slightly roughened. Abdomen ovate, smooth and shining, the first segment pale at the base, beyond which it is rufo-fuscous, sometimes entirely fuscous, or with the basal margins pale.

Worker.—Closely resembles the female, differs in wanting the ocelli, and in having the sides of the thorax compressed, and slightly strangulated at the apex of the mesothorax, which is much more finely sculptured than in the female, and granulated: the teeth on the metathorax minute, acute at their apex. Abdomen ovate, very smooth and shining, the first segment

having a broad rufo-testaceous fascia; sometimes the following segment rufo-testaceous.

I have not captured the male of this species; the diagnosis is from a specimen sent to me by M. Mayr of Vienna, and from the only British example which I have seen in Mr. Dale's collection; the species is rare. I have usually taken it in winter in moss, but once met with a colony in some decayed wood, and captured several females; this was nearly twenty years ago, in Colney Hatch Wood, since which I have not found it. The late Mr. Wing found a colony at Lambeth, and Mr. Dale has taken it in the New Forest and at Lulworth; he has also captured the male, which I suspect to be the *Stenammina albipennis*. The species very closely resembles the *M. muscorum* of Nylander, which species is more strongly sculptured, and the thorax longer and more deeply strangled. The male has scarcely the slightest trace of neuration in the wings.

Sp. 12. *Myrmica simillima*.

Operaria.—Rufo-pallida, abdomine fuscescente, basi pallido; capite longitudinaliter striolato; thorace longitudinaliter striatim-ruguloso; metathorace spinis parvis acutis dentiformibus.

Myrmica simillima, Nyland. MSS.; Smith, Cat. Brit. Hym., p. 118; Curtis, Trans. Linn. Soc., xxi. 216, 10.

Worker.—Length $\frac{3}{4}$ line. Head, thorax and nodes of the abdomen rufo-testaceous; the mandibles, flagellum and legs pale flavo-testaceous; abdomen shining, rufo-fuscous, pale at the base and extreme apex; head longitudinally strigose; antennæ 12-jointed. Thorax above rugose-striate; nearly transverse anteriorly or very slightly rounded, the angles acute, the usual divisional suture between the meso- and metathorax obsolete; the sides are doubly notched; the metathoracic spines short, dentiform and acute; the thorax is gradually narrowed towards the metathorax, which is truncate at the apex. Abdomen highly polished, and more or less rufo-fuscous, varying a little in different individuals; the nodes are finely rugose, the first being the most coarsely so. The entire insect is very thinly sprinkled with short erect pale hairs, most apparent on the abdomen at its apex.

I received this insect some years ago from Mr. Dale, who informed me that he had found them near his house at Glanvilles Wootton, Dorsetshire. It is closely allied to *M. tuberculum*; indeed I had considered it to be that species, and as such had included

it in my British list, but Dr. Nylander presented me with the insect which is considered on the continent to be Latreille's *F. tuberosum*: *M. simillima* differs in being much more deeply sculptured on the head, thorax and nodes of the abdomen, but it agrees in the essential and most characteristic specific distinction pointed out by Latreille, "le corcelet est court, conique, tronqué, comprimé insensiblement sur les côtés, aux le dos continu." For the sake of uniformity of opinion, however, I adopt with pleasure the views of Dr. Nylander, and other eminent Hymenopterists.

Sp. 13. *Myrmica* (?) *lævigata*, sp. nov.

Operaria.—Rufo-testacea, lævis, tota nitidissima nuda; mandibulis, antennis, pedum articulationibus tarsisque pallescentibus; nodo primo angusto; metathoracis spinis minutissimis.

Worker.—Rufo-testaceous; the mandibles, antennæ, joints of the legs, and the tarsi, pale testaceous; head highly polished, smooth and shining; antennæ 12-jointed, the scape as long as the head, the flagellum of about the same length: the scape most slender at its base; the three apical joints of the flagellum elongate, forming an elongate club, the apex acute; the three apical joints half the length of the flagellum. Thorax: smooth and shining, forming a sort of neck anteriorly, behind which it is dilated and rounded at the sides; above convex, smooth and shining; beyond the dilatation it is elongate, the sides being parallel, the apex of the metathorax truncate and delicately reticulated, the spines very minute; the nodes smooth and shining, the first petiolated; the second widest and globose; abdomen ovate, smooth, and shining; the legs elongate.

I captured this insect some years ago at Battersea; it differs so materially in form from the rest of the genus, that it is placed here with some hesitation and a suspicion that it may prove to be the female of *Stenammas*, but having only the single specimen described, I am unable to examine the parts of the mouth as satisfactorily as I could wish and leave it to be determined by some more fortunate student of this interesting group.

Sp. 14. *Myrmica domestica*.

Fœmina.—Pallide testacea, thoracis macula antica, scutello abdomineque fusco-nigris, basi solum pallido; clava flagelli triarticulata, metathorace mutico.

Operaria.—Pallide flavo-testacea, lævis; abdomine nitido, apice fuscescente.

Mas.—Fusco-testaceus, nitidus; antennis pedibusque pallide testaceis, antennis 13-articulatis; metathorace inermi; alis albo-hyalinis.

Myrmica domestica, Shuck. Ann. Mag. Nat. Hist., p. 626, (1838) ♂; Bostock, Trans. Ent. Soc. Lond., ii. 65; Smith, Cat. Brit. Hym. Append., p. 119, ♀, ♂; Daniell, Proc. Linn. Soc. ii. p. 172; Curtis, Trans. Linn. Soc., xxi. 217, 13.

Female.—Length $1\frac{3}{4}$ lines. Pale rufo-testaceous, the antennæ apparently 12-jointed; a minute black stain behind the anterior ocellus, and a similar one within each of the lateral ones, the stains touching the ocelli. Thorax elongate-ovate, having anteriorly a central elongate stain, a smaller one on each side, and the scutellum behind, fuscous; the legs very slender, and pale rufo-testaceous as well as the tips of the femora. Abdomen fusco-testaceous: ovate, smooth and shining; the base pale, also the apical margins of the two, or sometimes three, following segments.

Worker.—Pale reddish yellow: the apex and sides of the abdomen more or less fusco-testaceous, the antennæ 12-jointed; the head and thorax sub-opaque, the abdomen smooth and shining; the metathorax without spines; the thorax strangulated at the junction of the meta- and mesothorax.

Male.—Length 1 line. Fusco-testaceous: the head usually darkest, very delicately roughened and sub-opaque; ocelli prominent: the antennæ and legs pale testaceous; the scape slightly fuscous, sometimes only towards the base, the antennæ covered with very short pubescence. Thorax: very closely and very delicately punctured; the wings hyaline, the metathorax not spined. Abdomen ovate, smooth and shining; the scutellum is very convex, and the metathorax has a central longitudinal impressed line.

I have included this species amongst our indigenous insects, it having apparently become quite naturalized, but I have very strong reasons to believe that it was introduced. I resided in a house where this little pest had taken up its abode. The *Formicarium* was in the kitchen beneath the hearth, from thence up to the top of the house was a continuous line of ants constantly passing in opposite directions; the line became less multitudinous as it extended up-

wards. At every meal the ants swarmed on the dishes, and became exceedingly annoying by getting under the dresses of the inmates. Their multitudes were in the first instance thinned by putting pieces of meat into bottles without corking, and laying them near their *Formicarium*. Attracted by these baits, millions were destroyed, and in summer when the males and females first appeared, the hearth-stone was raised, and boiling water thrown over apparently countless myriads! At that time I obtained the sexes, which usually escape notice from their minuteness, but in houses infested they may be found on the windows. I never saw a female winged, and I have taken that sex at the same time as the winged males from the nest.

GENUS MYRMECINA, Curtis.

Antennæ inserted in the middle of the face, not approximate, 12-jointed apparently in the female, 13-jointed in the male; the females mandibulate; mandibles sometimes wanting in the males. Maxillary palpi 4-jointed; labial palpi 3-jointed. Wings, anterior pair having one marginal cell, appendiculated at its apex; one submarginal cell, a little longer than the marginal; the discoidal cells wanting; the metathorax armed with spines in the females; the abdomen having two nodes at its base.

Sp. 1. *Myrmecina Latreillii*.

Fœmina.—Rufo-fusca; clypeo bidentato; clypeo, mandibulis, antennis, metathorace postice pedibusque rufo-pallidis; capite ruguloso, thorace supra longitudinaliter profunde striato; metathoracis spinis dentiformibus acutis; alis fusco-brunneis.

Mas.—Fusco-niger; ocellis prominulis; flagellis pallide rufo-testaceis; scapo brevi crassiusculo, fusco; pedibus testaceo-rufis; alis fusco-brunneis.

Myrmecina Latreillii, Curtis, Brit. Ent., vi. tab. 226 ♂; Trans. Linn. Soc., xxi. 218, 16, tab. 4, fig. 22;
Westw. Introduc., ii. tab. 86, fig. 11.

Myrmica graminicola, Foerster, Hym. Stud. Form., 58, 30 ♂.

Female.—Length $1\frac{3}{4}$ lin. Head, thorax above, and the abdomen, nigro-fuscous; the face before the insertion of the antennæ, the latter as well the mandibles rufo-testaceous; the scape stout, about two-thirds of the length of the flagellum, of equal thickness

its entire length ; the antennæ pubescent ; the head finely rugose ; the mandibles stout, curved and obliquely truncated at their apex, the truncation finely denticulate ; the clypeus bidentate. Thorax : above finely longitudinally rugose-striate, the scutellum shining and smooth ; the metathoracic spines short, slightly bent outwardly ; wings of a fuscous brown, the stigma large and trigonate, and, as well as the nervures, fusco-testaceous ; the wings covered with very fine short pubescence, and their margins ciliated with short hairs ; the legs, neck and suture of the scutellum pale ferruginous ; the thorax at the sides and beneath and also the nodes rufo-fuscous ; the latter coarsely rugose. Abdomen : shining, oblong-ovate, and slightly widest posteriorly.

Worker.—Not known.

Male.—Length $1\frac{1}{2}$ lines. Dark fusco-testaceous ; the eyes ovate, large and prominent ; ocelli prominent, of a glassy brightness ; the mouth, antennæ and legs pale rufo-testaceous, the scape usually fuscous above ; the antennæ pubescent, the head has a few scattered hairs ; the thorax above and the nodes finely rugose ; the scutellum smooth and shining in the middle ; the matathorax emarginate the entire width, the angles prominent, sub-dentate ; wings of a rather paler colour than in the female. Abdomen oblong-ovate, smooth, shining and having, as well as the nodes, a few scattered long hairs.

Although this genus very closely approximates to that of *Myrmica*, still the different neuration of the wings, a certain difference in the proportions of the antennæ, and of the structure of the nodes of the abdomen, constitute a series of characters which I consider of generic value. It is not by the examination of the single British species that I am induced to arrive at this conclusion ; others from New Holland, &c., show a beautiful modification in form between this and allied genera. I must observe, however, that the males of some species have their mandibles more or less developed.

This species was discovered by Mr. Curtis some years ago : at that time males only were captured ; the type is beautifully figured in "The British Entomology" of Mr. Curtis. I have captured this apparently rare insect in the same locality that Mr. Curtis first discovered it, at the back of the Isle of Wight, near Luccomb Chine, when I took one female and one male ; one male at Colney Hatch, and one female at Camden New Town. I expect the societies, like those of *Ponera*, must be very small, as no one has discovered the worker.

Genus STENAMMA, Steph.

Basal joint of the antennæ long; abdominal peduncle 2-jointed, the first petiolate; antennæ 13-jointed; maxillary palpi 4-jointed, labial palpi 3 jointed; mandibles broad, oblique and 5-dentate.

Sp. 1. *Stenamma Westwoodii*.

Mas.—Pallido-fuscus, nitidus; antennis, partibus oris, tarsis, pedum articulationibus pallide testaceis; alis hyalinis, nervis testaceis; metathorace sub-dentiforme.

Stenamma Westwoodii, Steph. Syst. Cat., p. 356, 48, 38; Westw. Intro. Class. Ins., ii. 226, tab. 86, fig. 11, and details.

Male.—Length $1\frac{1}{2}$ lin. Fusco-testaceous; the antennæ, tarsi and articulations of the legs pale testaceous; the head and thorax finely rugose above; the eyes and ocelli prominent, the latter of a glassy brightness: the neuration of the wings as in *M. unifasciata*, the metathorax emarginate its entire length, the lateral angles acute and prominent, scarcely dentate. Abdomen: oblong-ovate, smooth and shining, the extreme apex pale testaceous; the petiole elongate; the first segment pear-shaped; the second subglobose, wider than the first, and smooth and shining.

I have great doubts whether this insect possesses sufficient generic distinctive differences to entitle it to a separation from the genus *Myrmica*. I do not possess a specimen, and therefore cannot examine, as I could wish, *all parts of the insect*; but the only character in which it appears to differ from *Myrmica* is in having 3-jointed labial palpi. An examination of the parts of the mouth of several males proves the relative proportions of the joints to be various, and in *M. unifasciata* the basal joint is so small, or altogether wanting, that I cannot detect it; I think this male may possibly prove to be that of *M. levigata*.

Sp. 2. *Stenamma albipennis*.

Stenamma albipennis, Curtis, Trans. Linn. Soc., xxi., 217, 15,
♂ & ♀.

I do not know this species; Mr. Curtis gives the locality of Folkestone, near Dover.

DESCRIPTION OF PLATE IX.

- Fig. 1. *Tapinoma erraticum*. Male.
 2. *Tapinoma lævigatum*. Worker.
 3. Profile of the abdomen of the same, showing the decumbent scale, and the metathorax.
 4. *Formica umbrata*. Female.
 5. Abdominal scale of *Formica umbrata*. Female.
 6. Abdominal scale of *Formica umbrata*. Worker.
 7. *Myrmica lævigata*. Worker.
 8. Antennæ of *Myrmica lævigata*. Worker.
 9. *Myrmica graminicola*. Female.
 10. *Myrmica cæspitum*. Male.
 11. *Myrmica cæspitum*. Female.
 12. Abdominal scale of *Formica sanguinea*. Male.
 13. Abdominal scale of *Formica rufa*. Male.
 14. Abdominal scale of *F. cunicularia*. Male.
 15. Abdominal scale of *F. fusca*. Male.
 16. Abdominal scale of *F. nigra*. Female.
 17. Abdominal scale of *F. flava*. Female.
 18. Abdominal scale of *F. flava*. Worker.
 19. Mandible of *F. rufa*. Worker.
 20. Antennæ of *Myrmica ruginodis*. Worker.
 21. Antennæ of *M. scabrinodis*. Worker.
 22. Wing of *Myrmica lævinodis*. Female.
 23. Wing of *M. scabrinodis*. Female.
 24. Wing of *Myrmecina Latreillii*. Female.
 25. Wing of *Stenammina Westwoodii*.
 26. Antennæ of *Myrmica identicornis*.
 27. Wing of *Formica nigra*. Female.
 28. Wing of *Formica flava*. Female.
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